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61	BRS	ш	5870484.pn. and sdr	USPAT	2003/01/06 15:53		
62	BRS	Н	5870484.pn. and sdr	USPAT	2003/01/06 15:54		
63	BRS	Н	5870484.pn. and correlat\$3	USPAT	2003/01/06 15:54		
64	BRS	314	381/1.ccls.	USPAT	2003/01/07 11:45		***************************************
65	BRS	65	381/1.ccls. and display	USPAT	2003/01/07 13:48		
9	BRS	257	381/17.ccls.	USPAT	003 2:4		
67	BRS	72	381/17.ccls. and display	USPAT			
89	BRS	170	381/18.ccls.	USPAT	2003/01/07 13:47		
69	BRS	48	381/18.ccls. and display	USPAT	2003/01/07 15:14		
70	BRS	86	381/1.ccls. and display	USPAT; US-PGPUB; EPO; JPO	2003/01/07 13:48		
71	BRS	93	381/17.ccls. and display	USPAT; US-PGPUB; EPO; JPO	2003/01/07 14:12		
72	BRS	5 5	381/18.ccls. and display	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:01		
73	BRS	376	381/61.ccls.	USPAT; US-PGPUB; EPO; JPO	2003/01/07 15:20		

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74	BRS	82	381/61.ccls. and display	USPAT; US-PGPUB; EPO; JPO	2003/01/07 15:49	
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77	BRS	64	(audio sound stereo) and display and mengistu.xp.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 10:56	
78	BRS	<b>⊢</b> ³	5812688.pn.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 10:56	
79	BRS	Н	"5286908".PN.	USPAT	2003/01/08 10:56	
80	BRS	H	"5283867".PN.	USPAT	2003/01/08 10:57	
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82	BRS	Ľ	"5153829".PN.	USPAT	2003/01/08 10:58	
83	BRS	1	"5048390".PN.	USPAT	2003/01/08 10:58	
84	BRS	Ъ	"5048390".PN.	USPAT	2003/01/08 10:59	
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90	BRS	δ	4464781.uref.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:03		
91	BRS	IJ	4691358.uref.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:06		
92	BRS	ω	5272756.uref.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:13		
93	BRS	Р	"5410245".PN.	USPAT	2003/01/08 14:07		
94	BRS	Н	"5272756".PN.	USPAT	2003/01/08 14:07		
95	BRS	Н	"4176375".PN.	USPAT	2003/01/08 14:07		
96	BRS	1	"3649819".PN.	USPAT	2003/01/08 14:08		
97	BRS	Н	"3643251".PN.	USPAT	2003/01/08 14:08		
86	BRS	Н	"3320409".PN.	USPAT	2003/01/08 14:08		
99	BRS	203	386/54.ccls.	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:14		

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100 BRS	8 4	386/54.ccls. and display	USPAT; US-PGPUB; EPO; JPO	2003/01/08 14:36		
101 BRS	4710	345/\$.ccls. and (audio sound stereo) same display	USPAT; US-PGPUB; EPO: JPO	2003/01/08 14:46		
102 BRS	25	345/441.ccls. and (audio sound stereo) same display	USPAT; US-PGPUB; EPO; JPO	2003/01/08 16:12		
103 BRS	2 5	381/\$.ccls. and display and ("+1" same "-1")	USPAT; US-PGPUB; EPO; JPO	2003/01/08		
104 BRS	47	381/\$.ccls. and display and ("1" same "-1")	USPAT;			1

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76	BRS	Н	5870073.pn.	USPAT; US-PGPUB; EPO; JPO	H 20	2003/05/22 16:10	
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78	BRS	0	345/698.ccls. and re?output\$3	USPAT; US-PGPUB; EPO; JPO	H 10	2003/05/22 16:11	003/05/ 6:11
79	BRS	ω	345/\$.ccls. and re?output\$3	USPAT; US-PGPUB; EPO; JPO	1 1 8 3	2003/05/22 16:14	05/
08	BRS	4	345/\$.ccls. and re?output\$4	USPAT; US-PGPUB; EPO; JPO	1 1 8 3	2003/05/22 16:14	
81	BRS	ហ	345/\$.ccls. and (re?output\$4 reoutput\$4)	USPAT; US-PGPUB; EPO; JPO		2003/05/22 16:15	05/
82	BRS	83	(scan scanning) and (re?output\$4 reoutput\$4)	USPAT; US-PGPUB; EPO; JPO	····	2003/05/22 16:16	
83	BRS	40	(scan scanning) and (re?output\$4 reoutput\$4) and resolution	USPAT; US-PGPUB; EPO; JPO		2003/05/22 16:16	
84	BRS	ω &	(scan scanning) and (re?output\$4 reoutput\$4) and resolution and memory	USPAT; US-PGPUB; EPO; JPO		2003/05/22 16:16	

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Тур	P Hits	Search Text	DBs	Time Stamp	Comment s	Error Definit ion
85 BRS	ω	(scan scanning) and (re?output\$4 reoutput\$4) and resolution and frame near memory	USPAT; US-PGPUB; EPO; JPO	2003/05/22 16:18		
86 BRS	2 4	(scan scanning) and (re?output\$4 reoutput\$4) and frame near memory	USPAT; US-PGPUB; EPO; JPO	2003/05/22	***************************************	
87 BRS	S 78	(scan scanning) and (re?output\$4 reoutput\$4) and memory	USPAT; US-PGPUB; EPO; JPO	2003/05/22		
88 BRS	S 29	frequency and (scan scanning) and (re?output\$4 reoutput\$4) and memory	USPAT; US-PGPUB; EPO; JPO	2003/05/22 16:20		
89 BRS	S 1	6069607.pn.	USPAT	2003/05/23 12:40		
90 BRS	S 1	"5926228".PN.	USPAT	2003/05/23 11:02		
91 BRS	S 1	"5856930".PN.	USPAT	2003/05/23 11:02		
92 BRS	S 1	"5737032".PN.	USPAT			
93 BRS	S 1	"5553140".PN.	USPAT	2003/05/23 11:03		
94 BRS	S 1	"5537157".PN.	USPAT	2003/05/23 11:03		

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	Тур	Hits	Search Text	DBs	Time Stamp	Comment	Error Definit ion	Errors
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105	BRS	65	audio and Lissajous and display	USPAT	2003/05/23 13:07			0
106	BRS	65	audio and Lissajous and display	USPAT	2003/05/23 13:15			0
107	BRS	Н	5619220.uref.	USPAT	2003/05/23 13:20			0
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114	BRS	۲	"3320409".PN.	USPAT	2003/05/23 13:14			0
115	BRS	10	4648113.uref.	USPAT	2003/05/23 15:01			0
116	BRS	18	5412731.uref.	USPAT	2003/05/23 16:53			0
117	BRS	2488	audio same display and channel and scale	USPAT	2003/05/23 16:54			0
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119	BRS	74	audio same display and channel same scale and correlation	USPAT	2003/05/23 17:25			0
120	BRS	З	4227254.uref.	USPAT	2003/05/23 17:20			0
121	BRS	3	4661994.uref.	USPAT	2003/05/23 17:20			0

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122	BRS	10	stereo same display and channel same scale and correlation	USPAT	2003/05/23 17:23			0
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124	BRS	2	stereo and display same channel same scale and correlation	USPAT; US-PGPUB; EPO; JPO	2003/05/23 17:24			0
125	BRS	33	audio and display same channel same scale and correlation	USPAT; US-PGPUB; EPO; JPO	2003/05/23 17:32			0
126	BRS	80	audio same display same scale and correlation	USPAT; US-PGPUB; EPO; JPO	2003/05/23 17:50			0
127	BRS	16	stereo same display same scale and correlation	USPAT; US-PGPUB; EPO; JPO	2003/05/23 18:54			0
128	BRS	0	stereo and display and bent near scale same correlation	USPAT; US-PGPUB; EPO; JPO	2003/05/23 18:55			0
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# Surrounded!\_

Ever since Stereophonic sound became popular in the 50's the race has been on to create the ultimate home listening experience. Even as far back as the 40's, Walt Disney incorporated his <u>Fantasound</u> surround sound technology in order to totaly immerse the audience in both the visual and audio sensations of his animation achievement, <u>Fantasia</u>. Although this, and other early experiments in surround sound technology could not really be duplicated in the home enivronment, that didn't limit the quest by recording engineers for both music and film to develop processes that would eventually result in the several surround sound formats that are enjoyed in Home Theaters all around the world today.

Sound reproduction for the home comes in three basic flavors: Monophonic, Stereophonic, and Surround.

#### **Monophonic Sound**

Suprisingly, I still get many questions from consumers as to what the difference between Monophonic and Stereophonic sound is. Basically, Monophonic sound is a single-channel, unidirectional type of sound reproduction. All elements of the sound recording are directed using one amplifier and speaker combination. No matter where you stand in a room you hear all the elements of the sound equally (except for room acoustic variations). To the ear, all the elements of the sound, voice, instruments, effects, etc... appear to originate from the same point in space. It is as if everything is "funneled" to a single point. In fact, if you connect two speakers to a Monophonic amplifier, the sound will appear to originate at a point equidistant between the two speakers, creating a "phantom" channel.

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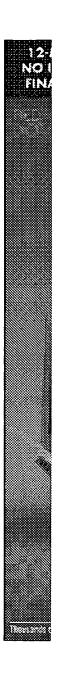
### **Stereophonic Sound**

Stereophonic Sound, on the other hand, is a more open type of sound reproduction, that, although not totally realistic, lets the listener experience the correct sound staging of the performance. The main aspect of Stereophonic sound is the division of sounds across two channels of amplification. The recorded sounds are mixed in such a way that some elements are channeled to the left part of the soundstage, others to the right. One positive result of this process is that listeners experience the correct soundstaging of symphony orchestra recordings, where sounds from the various instruments more naturally emanate from different parts of the stage. Along with this however, monophonic elements are also included. By mixing the sound from, lets say, a lead vocalist in a band, into both channels, the vocalist appears to be singing from the "phantom" center channel, between the left and right channels.

Although Stereophonic Sound was a great breakthough for the consumers of the 50' and 60's, it did have its limitations. For instance, some recordings resulted in ping-pong type of effect in which the mixing emphasized the difference in the left and right channels too much and not enough mixing of elements in the "phantom" center channel. Also, even though the sound was more realistic, the lack of ambience information, such as acoustics or other elements, left Stereophonic sound with a "wall effect" in which everything hit you from front and lacked the natural sound of back wall relfections or other acoustic elements.

#### Quadraphonic Sound

Two developments occurred in the late 60's and early 70's that attempted to address this issue. Four Channel Discrete and Quadraphonic sound. The problem with Four Channel Discrete, in which four totally identical amplifiers (or two stereo ones) were needed to reproduce the sound, is that it was extremely expensive (these were the days of Tubes and Transisitors, not IC's and Chips), add the cost of matched speakers and it was really not very cost effective. Also, such sound reproduction was really only available on Broadcast (two FM stations each broadcasting two channels of the program simultaneously--obviously you needed two tuners to receive it all), and four channel Reel-to-Reel audio decks. which were also expensive. In addition, Vinyl LP's and Turntables could not handle playback of four channel discrete recordings. Although several interesting musical performances were simulcast using this technology (with a co-operating TV Station broadcasting the Video Portion), the whole set-up was too cumbersome for the average consumer.



Quadraphonic sound attempted to bridge the gap. Taking a more realistic and affordable approach to sound reproduction than Four Channel Discrete, Quad (which came in a couple of derivatives) basically consisted of an encoding of four channels of information within a two channel recording. The practical result is that ambient or effects sounds could be imbedded in a two channel recording that could be retrieved by a normal phono stylus and passed through to a receiver or amplifier with a Quadraphonic decoder. In essence, Quad was the forerunner of today's Dolby Surround Technologies (in fact, if you own any old Quad equipment yourself--they have the ability to decode most Dolby Surround signals. Although Quad had the promise to bring affordable surround sound to the home environment, the requirement to buy new amplifiers and receivers, additional speakers, and ultimately lack of concensus amongst hardware and software makers on standards and programming, Quad merely ran out of gas before it could truly arrive.

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### Surrounded: The Emergence Of Dolby Surround Page 1, 2

Finally, in the mid-70's Dolby Labs, with breakthrough film soundtracks such as Tommy, Star Wars, and Close Encounters of the Third Kind, unveiled a new surround sound process that was more easily adaptable for home use. Also, with the advent of the HiFi Stereo VCR and Stereo TV Broadcasting in the 80's, there was an additional avenue for which to gain public acceptance of surround sound: Home Theater. Up to that point, listening to the sound portion of a TV Broadcast or VCR tape was like listening to a tabletop AM radio. With the ability encode the same surround information into a two channel signal that was encoded in the original Movie or TV soundtrack, software and hardware manufacturers had a new incentive to make affordable Surround sound components. Add-on Dolby Surround processors became available for those that already owned Stereo-only receivers. As the popularity of this experience reached into the more and more homes, more affordable Dolby Surround sound receivers and amplifiers became available, finally making Surround sound a permanent part of the Home Entertainment experience.

### **Dolby Surround and Dolby Pro-Logic**

The Dolby Surround process involves encoding four channels of information--Front Left, Center, Front Right, and Rear Surround into a two channel signal. A decoding chip then decodes the four channels and sends them to the appropriate destination, the Left, Right, Rear, and Phantom Center (center channel is derived from the L/R front channels). The result is a more balanced listening environment in which the main sounds derive from the left and right channels, the vocal or dialog emanates from the center phantom channel, and the ambience or effects information comes in from behind the listener. In musical recordings encoded with this process the sound has a more natural feel, with better acoustical cues. In movie

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soundtracks the sensation of sounds moving from front to rear and left to right adds more realism to the viewing/listening experience by placing the viewer in the action. Dolby Surround is easily useful in both musical and film sound recording.

Dolby Surround does have its limitations however, with the rear channel being basically passive, it lacks precise directionality. Also, overall separation between channels is much less than a typical Stereophonic recording. Dolby Pro-Logic addresses this issue by adding hardware elements in the decoding chip that emphasize important directional cues in a movie soundtrack. In other words, the decoding chip will add emphasis to directional sounds by increasing the output of the directional sounds in their respective channels. This process, although not important in musical recordings is very effective for Film soundtracks and adds more accuracy to effects such as explosions, planes flying overhead, etc.. There is greater separation between channels. In addition, Dolby Pro-Logic extracts a dedicated Center Channel that more accurately centers the dialog (this necessitates a center channel speaker for full effect) in a movie soundtrack.

Athough Dolby Pro-Logic is an excellent refinement of Dolby Surround, its effects are derived strictly in the reproduction process, and even though the rear surround channel employs two speakers, they are still passing a monophonic signal, limiting rear-to-front and side-to-front motion and sound placement cues.

### **Dolby Digital**

Dolby Digital adds both accuracy and flexibility by adding stereo rear surround channels that enable sounds to emanate in more directions, as well as a dedicated Subwoofer Channel to provide more emphasis for low frequency effects. Dolby Digital is often referred to as a 5.1 channel system, because of the added Subwoofer channel. Also, unlike Dolby Pro-logic which requires a rear channel of only minimal power and linited frequency response, Dolby Digital encoding/decoding requires the same power output and frequency range as the main channels. Dolby Digital encoding on DVDs, Laserdiscs, and Satellite programming is very common and has solidified this format in the marketplace. Since Dolby Digital involves its own encoding process, you need to have a Dolby Digital receiver or amplifier to accurately decode the signal.

#### **DTS**

Dolby Labs, however, is not the only player in the home



surround sound market, <u>Digital Theater Systems</u> has also adapted its surround sound process for home use. It is a 5.1 system just like Dolby Digital, but since DTS uses less compression in encoding process, many feel that DTS has a better result on the listening end. In addition, while Dolby Digital is mainly intended for the Movie Soundtrack experience, DTS is being used in the mixing and reproduction of Musical performances. Many CD-only players now come equipped with DTS outputs that allow a DTS-equipped amplifier or receiver to decode the DTS signals imprinted on "select" DTS-encoded music CD's.

#### THX

Finally we have THX. Many consumers are under the misnomer that THX is an altogether different surround sound system, but, in actuality it is a Certification Program that manufacturers use to see if they meet the standards that Lusafilm has set for optimal surround sound performance. Components, from receivers, amps, and speakers have to meet certain performance and construction requirements in order to get the THX logo on their products. In order to achieve the full effect of this certification process, all the components in your system must bear the THX logo.

#### MORE ON SURROUND SOUND

**UPDATE #1:** THX and Dolby Labs have since teamed up to develop an enhancement to the Dolby Digital 5.1 System called THX Surround EX, which is outlined in my article <u>Surrounded! Part II -THX Surround EX</u>.

**UPDATE #2:** Check out the third installment of my series on Surround Sound, entitled <u>Surrounded! Part III: Dolby Pro Logic II</u>.

This has been a brief overview of Surround Sound that, I hope, will aid those of you that are planning to either assemble or upgrade a home entertainment/theater system. To get more specific technical information, click on the links scattered throughout the above article. For more specific product links check out the netlink references below.

Now go and get yourself Surrounded!

For more information on Surround Sound and Home Theater, check out my <u>Home Theater Netlinks</u>.

For more product information, such as Stereo and AV Receivers, check out my <u>Audio Components Netlinks</u>.